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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/800,638
Filing Date: March 07, 2001
Appellant(s): ATKINS ET AL.

John P. Wagner
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/11/2006 appealing from the Office action mailed 1/24/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,646,762 Balasubramanian et al.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-17,19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Balasubramanian et al. (US Patent 6,646,762 B1).

Regarding claim 1, Balasubramanian et al. ("Bala"), discloses an image processing system comprising:

a) a filter selection mechanism (Fig. 6, num. 400) for receiving an input pixel window (or "predefined neigh-borhood" in col. 7, lines 42,42 is interpreted as at least one center pixel and a neighboring pixel which corresponds to "receiving a set of pixels defining at least a portion of an image" in col. 3, lines 30,31 which could range from at least two pixels to the whole image) and responsive thereto for generating a filter identifier (upon the output of fig. 6,num. 400) based on one of:

a1) an edge parameter ("High activity [strong edges]" in col. 7, line 34) computed (using the equations of column 7) based on the input pixel window (since the predefined neighborhood is used to determine the presence of high activity) and

a2) an activity metric ("Very low activity" in col. 7, line 30) not indicating an edge parameter (since low activity corresponds to "flat areas" in col. 7, line 30) computed based on the input pixel window (since the predefined neighborhood is again used to determine the presence of low activity)

b) wherein a combination (as shown in a "ratio" in col. 8, line 5, "a_L/a_s" in fig. 10, num. 308 is a combination of "activity metrics" in col. 8, line 6) of both the edge parameter ("High activity [strong edges]" in col. 7, line 34 would correspond to one activity metric of the ratio) and the activity metric ("Very low activity" in col. 7, line 30 would correspond to the other activity metric of the ratio) is not required (The combination as shown in a "ratio" in col. 8, line 5, "a_L/a_s" in fig. 10, num. 308 is a combination of "activity metrics" in col. 8, line 6 is not required as shown in fig. 10, num. 302 where one activity metric, a_s, is used to select the filter of fig. 10,num. 304: USE SMALL FILTER which corresponds to either a "small filter" in col. 7, line 30 of the "Very low activity" in col. 7, line 30 or "small filter" in col. 7, line 34 of the "High activity" in col. 7, line 34) for the generating of the filter identifier; and

c) a filter application unit (Fig. 6,num. 302) coupled to the filter selection mechanism (Fig. 6, num. 400) for:

c1) receiving the filter identifier (output arrow of fig. 6,num. 400) and

c2) applying a filter (upon the output of fig. 6,num. 302) identified by the filter identifier (output arrow of fig. 6,num. 400) to the input pixel window (said predefined neighborhood since the filter is a function of "local image data" in col. 7, line 12 or "local neighborhood of pixels" in col. 3, line 26 which is interpreted as said predefined neighborhood of said center pixel and neighborhood pixel or even said whole image since said set of pixels defines at least a portion of an image) to generate an output pixel (Output arrow of fig. 6,num. 104 represents an output pixel, ΔY'.).

Regarding claim 2, Bala disclose the image processing system of claim 1 further comprising:

a) an edge parameter evaluation unit (Fig. 6, num. 400: ACTIVITY METRIC is an edge parameter evaluation unit.) for computing at least one edge parameter based on the input pixel window (Fig. 6, num. 400: ACTIVITY METRIC is an edge parameter evaluation unit for computing at least one edge parameter or "High activity [strong edges]" in col. 7, line 34 using the equations of column 7 based on the input pixel window or "footprint" of col. 7, line 31.).

Regarding claim 3, Bala discloses the image processing system of claim 2 wherein the edge parameter (or "High activity [strong edges]" in col. 7, line 34) is one of an edge angle, an edge sharpness, an edge curvature, and any measurable unit (">1" in col. 7, line 35 is a measurable unit to determine strong edges.) related to an edge.

Claim 4 is rejected the same as claim 2. Thus, argument similar to that presented above for claim 2 is equally applicable to claim 4.

Regarding claim 5, Bala discloses the image processing system of claim 4 wherein the activity metric ("Very low activity" in col. 7, line 30) is selected from a group (from a group of "L*,a*,b*" or "(L,C1,C2)" space in col. 4, lines 27-31) consisting of:

a level of variation of a red color plane, a level of variation of a green color plane, a level of variation of a blue color plane, a level of variation of a luminance plane (As shown in fig. 6, num. 102 outputs a variation or luminance difference, ΔY.), a mean absolute deviation of a red color plane, a mean absolute deviation of a green color plane, a mean absolute deviation of a blue color plane, and a mean absolute deviation of a luminance plane.

Regarding claim 6, Bala discloses the image processing system of claim 1 wherein the filter application unit includes a filter repository (or "a number of pre-selected filters" in col. 8, line 17) for providing a plurality of filters for use by the filter application unit.

Regarding claim 7, Bala discloses the image processing system of claim 6 wherein the filter repository includes one of:

a blurring filter, a smoothing filter ("blur filter" in col. 7, lines 17,18), a sharpening filter, and an enhancement filter ("enhance detail" in col. 7, line 4).

Claim 8 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 of a system is equally applicable to claim 8 of a method except for the additional limitation of the claimed "input pixel" which is disclosed in Bala as "the center pixel" in col. 7, line 40.

Regarding claim 9, Bala discloses the method of claim 8 wherein the step of receiving the input pixel window corresponding to the current input pixel includes the step of:

a) receiving the input pixel window (Figure 6, num. 104 receives an input pixel window or "n x m block...ΔY" in col. 5, line 43.) that includes the current input pixel and pixels adjacent to the current input pixel (Figure 6, num. 104 receives an input pixel window or "n x m block...ΔY" in col. 5, line 43 that includes a current input pixel or "center pixel" in col. 7, line 40 and "neighbor[ing]" in col. 7, lines 41,42 pixels adjacent to the current input pixel.).

Claim 10 is rejected the same as claim 9. Thus, argument similar to that presented above for claim 9 is equally applicable to claim 10.

Regarding claim 11, Bala discloses the method of claim 8 wherein the step of generating the filter identifier based on one of the edge parameter and the activity metric includes the steps of:

a) computing at least one edge parameter (Fig. 10, num. 300: COMPUTE SMALL AREA ACTIVITY a_s computes at least one edge parameter, a_s, because a small activity area corresponds to a "SMALL AREA FILTER" as shown in fig. 10, num. 310 or "small filter footprint" in col. 7, lines 34,35 which in turn corresponds to "strong edges" in col. 7, line 34.) based on the input pixel window (Fig. 10, num. 300: COMPUTE SMALL AREA ACTIVITY a_s computes at least one edge parameter, a_s, because a small activity area corresponds to a "SMALL AREA FILTER" as shown in fig. 10, num. 310 or "small filter footprint" in col. 7, lines 34,35 which in turn corresponds to "strong edges" in col. 7, line 34 based on the "n x m block...ΔY" in col. 5, line 43 as represented in fig. 6 as ΔY.); and

b) utilizing the edge parameter (The edge parameter, a_s, is utilized in fig. 10, num. 308.) to generate the filter identifier (YES of fig. 10, num. 308.).

Claim 12 is rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 is equally applicable to claim 12.

Claim 13 is rejected the same as claim 11. Thus, argument similar to that presented above for claim 11 is equally applicable to claim 13.

Claim 14 is rejected the same as claim 5. Thus, argument similar to that presented above for claim 5 is equally applicable to claim 14.

Regarding claim 15, Bala discloses a method for processing a digital image having a plurality of input pixels comprising:

a) receiving the digital image (Fig. 6, label: GAMUT MAPPING G1 receives the digital image represented as C_1,C_2 and Y via two input arrows.); and

b) for each input pixel (or "center pixel" in col. 7, line 40) associated with the digital image:

b1) generating a level of variation (Fig. 10, num. 300: COMPUTE SMALL AREA ACTIVITY a_s generates a level of variation or ACTIVITY a_s) based on a first window of pixels (or "predefined neigh-borhood" in col. 7, lines 42,42 is interpreted as at least one center pixel and a neighboring pixel) with reference to an input pixel ("center pixel" in col. 7, line 40.);

b2) determining (Fig. 10, num. 302 is a determining step) whether the level of variation (Fig. 10, num. 302 determines whether "a_s" corresponds to the claimed level of variation as shown in step 302) is in a predetermined relationship with a predetermined level of variation (A "range" in col. 8, line 2 which is shown in fig. 10, num. 302 as "$t_1<a_s<t_2$."");

b3) when the level of variation is in the predetermined relationship (NO branch of fig. 10, num. 302) with the predetermined level of variation,

b3a) applying a first filter (Fig. 10,num. 304: USE SMALL AREA FILTER.); and

b4) when the level of variation is not in the predetermined relationship with the predetermined level of variation (YES branch of fig. 10, num. 302),

b4a) generating a measure of an edge parameter (Fig. 10, num. 306: COMPUTE LARGE AREA ACTIVITY a_L generates a measure of an edge parameter because the parameter a_L is used to determine an edge in the next step 308) based on a second window of pixels (or based on said "predefined neigh-borhood" in col. 7, lines 42,42) with reference to the input pixel (since the "center pixel" in col. 7, line 40 and a neighboring pixel of said neighborhood is used to generate said edge parameter, a_L),

b4b) selecting an enhancement filter (Fig. 10, num. 308 is a step that selects via a YES branch an enhancement filter of fig. 10, num. 310: USE SMALL AREA FILTER) based on the measurement of the edge parameter (parameter a_L in step 308), and

b4c) applying the selected enhancement filter (Fig. 10, num. 310: USE SMALL AREA FILTER is applied) to a third window (Fig. 10, num. 310: USE SMALL AREA FILTER is applied or used on a third window or SMALL AREA of fig. 10,num. 310) to generate an output pixel (or output pixel $\Delta Y'$ as shown as an output of fig. 6,num. 104) corresponding to the current input pixel (ΔY as shown as the output of fig. 6,num. 102) being processed from the each input pixel associated with the digital image,

c) wherein a combination of both the edge parameter ("a_L" of fig. 10,num. 306) and the level of variation ("a_s" of fig. 10,num. 300) is not required (via "simple activity measures" in col. 8, line 12 which corresponds to "a_L" of fig. 10,num. 306 is "sufficient to select the appropriate filters" in col. 8, lines 12,13 as opposed to a_L/ a_s of fig. 10, num. 308 which is not as simple as a_L) for the selecting of the enhancement filter (Fig. 10, num. 308 is a step that selects via a YES branch an enhancement filter of fig. 10, num. 310: USE SMALL AREA FILTER wherein a combination of both the edge parameter a_L and the level of variation "a_s" as shown in the selecting an enhancement filter step of fig. 10, num. 308 is not required using said simple activity measures), and

d) wherein the first window ("predefined neigh-borhood" in col. 7, lines 42,42) the second window ("predefined neigh-borhood" in col. 7, lines 42,42) , and the third window (SMALL AREA of fig. 10,num. 310) are the same window of pixels (since the activities of "a_L" of fig. 10,num. 306 and "a_s" of fig. 10,num. 300 are computed using said predefined neighborhood (two adjacent pixels) so that the claimed third window or SMALL AREA of fig. 10,num. 310 is applied to said predefined neighborhood for filtering the SMALL AREA which is interpreted to include said predefined neighborhood based on activities "a_L" of fig. 10,num. 306 and "a_s" of fig. 10,num. 300. Note that Bala does not state the size of the predefined neighborhood and mentions that the neighborhood includes a "center pixel...[and a]...neigh-borhood...pixel" in col. 7, lines 40-42. Thus, the examiner interprets the predefined neighborhood as at least two adjacent pixels which corresponds to the claimed first, second and third window of pixels).

Claim 16 is rejected the same as claim 9. Thus, argument similar to that presented above for claim 9 is equally applicable to claim 16.

Regarding claim 17, Bala discloses the method of claim 15 wherein the first filter is a low pass filter ("blur filter" in col. 7, lines 17,18.) that replaces the current input pixel with a blurred version of the current input pixel.

Claim 19 is rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 is equally applicable to claim 19.

Regarding claim 20, Bala discloses the method of claim 15 wherein the first window (The first window of pixels or SMALL AREA of fig. 10, num. 300.), the second window (Fig. 10, num. 306: ...LARGE AREA...), and the third window (SMALL AREA of fig. 10,num. 310) are the same window of pixels (All of the windows are the same window of pixels because all of the windows process the same pixels at different window sizes.).

(10) Response to Argument

Applicant's arguments on page 8,2nd paragraph filed 9/11/2006 have been fully considered but they are not persuasive and states:

"Balasubramanian does not teach...the...limitation of 'generating a filter identifier based on one of an edge parameter computed based on the input pixel window and an activity metric not indicating an edge parameter computed based on the input pixel window'..."

However the examiner respectfully disagrees since Balasubramanian does disclose the limitation of generating a filter identifier (upon the output of fig. 6,num. 400) based on one of an edge parameter (or ACTIVITY METRIC in fig. 6 that corresponds to "strong edges" in col. 7, line 35) computed based on the input pixel window (or "predefined neigh-borhood" in col. 7, lines 41,42) and an activity metric not indicating an edge parameter (or ACTIVITY METRIC in fig. 6 that corresponds to "flat areas" in col. 7, line 31) computed based on the input pixel window (or said "predefined neigh-borhood" in col. 7, lines 41,42 which is interpreted to include at least two pixels as a window.

In another interpretation Balasubramanian discloses "a small activity metric...is computed...using...the small area filter calculation...[and] a large area activity...is computed...using the...large area filter calculation." from col. 7, line 65 to col. 8, line 4 and the examiner agrees with the applicant about subject matter not claimed that there appears to be different size windows to compute the activity metric (see next argument below, page 9 2nd paragraph of the brief); however, Balasubramanian also states the size of the filters or "footprint" in col. 7, line 15 can be constant size while "chang[ing] the filter values or coefficients" in col. 7, lines 14,15. Thus in light of a constant filter size or footprint the above statement from col. 7, line 65 to col. 8, line 4 is interpreted as "a small activity metric...is computed...using...the small area filter calculation...[and] a large area activity...is computed...using the...large area filter calculation [that is the same size as the small area filter calculation but with changed coefficients].).

Thus, Balasubramanian does disclose computing the claimed edge parameter and activity metric using the same window in both interpretations of a predefined neighborhood and constant footprint as addressed above.

Applicant's arguments on page 9,2nd paragraph filed 9/11/2006 have been fully considered but they are not persuasive and states:

"Balasubramanian teaches that different filters meant to filter different size areas can be applied to different size areas. In particular, Balasubramanian teaches that activity levels for <u>different</u> size areas are computed in selecting a filter."

However the examiner respectfully disagrees since Balasubramanian teaches that "filter windows or footprints..." in col. 7, line 8 that have "filter values or coefficients" in col. 7lines 14,15 that "change...rather than the footprint [or window]." In col. 7, lines 14,15.

Thus, the invention can be practiced using the same filter window or footprint but changing the filter's values or coefficients.

Applicant's arguments on page 9,3rd paragraph of the appeal brief, filed 9/11/2006 have been fully considered but they are not persuasive and states:

"Balasubramanian does not teach...'generating a filter identifier based on one of an edge parameter computed based on the input pixel window and an activity metric not indicating an edge parameter computed based on the input pixel window'..."

However the examiner respectfully disagrees since Balasubramanian discloses generating a filter identifier (upon the output of fig. 6,num. 400) based on one of an edge parameter (or "High activity" in col. 7, line 35) computed based on the input pixel window (or "predefined neigh-borhood" in col. 7, lines 41,42) and an activity metric not indicating an edge parameter (or "low activity" in col. 7, line 31) computed based on the input pixel window (or said "predefined neigh-borhood" in col. 7, lines 41,42 since the neighborhood corresponds to "local...measures" in col. 7, line 28 wherein said local corresponds to a "local neighborhood of pixels" in col. 3, line 26 which is interpreted to range from at least two pixels or "a set of pixels" in col. 3, line 30 to the whole input or original image or "a set of pixels defining at least a portion of an image" in col. 3, lines 30,31).

Thus, Balasubramanian does clearly teach or disclose as discussed above what applicants state that is not taught or disclosed in Balasubramanian.

Applicant's arguments on page 9,3rd paragraph of the brief filed 9/11/2006 have been fully considered but they are not persuasive and states:

"Appellants...assert that the small activity metric and the large activity metric are calculated based on <u>different</u> input windows."

However, the examiner respectfully disagrees for the same reasons as discussed above with respect to page 9, 2nd paragraph of the brief.

Applicant's arguments on page 10,2nd paragraph, filed 9/11/2006 have been fully considered but they are not persuasive and states:

"By explicitly teaching that the activity metrics are calculated based on different input windows of different sizes, Balasubramanian <u>teaches away from</u> the claimed configuration."

However, the examiner respectfully disagrees since Balasubramanian also teaches that activity metrics or low activity, medium activity and high activity as discussed in col. 7, lines 30-36 are calculated based on a "predefined neighborhood" in col. 7, lines 41,42 which is made of at least two pixels one of which is called a "center pixel" in col. 7, line 40 and the other called "pixel j within the predefined neigh-borhood" in col. 7, lines 41,42. Wherein the predefined neigh-borhood is interpreted as at least two pixels which corresponds to the claimed input pixel window or the predefined

neighborhood is interpreted as a "5 X 5 footprint" in col. 7, lines 31 and 35 wherein said low activity, corresponding to the claimed activity metric of claim 1, and high activity, corresponding to the claimed edge parameter, is computed using said 5 X 5 footprint or predefined neighborhood.

Thus, Balasubramanian does not teach away since Balasubramaninan teaches calculating activity metrics using a predefined neighborhood which is interpreted as at least two pixels or a 5 X 5 footprint or window. Also see applicant's arguments above with respect to page 9,2nd paragraph with respect to a constant window or footprint with variable coefficients.

Applicant's arguments on page 11,1st paragraph, filed 9/11/2006 have been fully considered but they are not persuasive and states:

"By relying on these different definitions of 'footprint', the Examiner has failed to establish a prima facie rejection. In particular, by relying on different definitions of 'footprint' in supporting the rejection of the claims, the Examiner has failed to establish that Balasubramanian discloses the claimed invention 'arranged as in the claim.'"

However, the examiner respectfully disagrees since the footprint's size was interpreted to be repeatedly used in order to determine a metric corresponding to an edge or flat areas hence the footprint is the same or in common to a measurement on

an area corresponding to the footprint of the filter for a possible edge or possible flat area within an area for filtering; especially in light of Balasubramanian's statement of:

"It should be noted that one could also change the filter values or coefficients (rather than the footprint)." in col. 7, lines 13-15 which is interpreted to mean that the filter footprint or window is of constant size.

Thus, the examiner believes that a prima facie rejection is established since Balasubramanian teaches an area of an image for filtering is measured to determine the presence or absence of an edge or flat area using the same size footprint and apply a filter for edges or a flat area accordingly as discussed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

DR 12/05/2006

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